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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

NGUYEN, JOSEPH H

ART UNIT PAPER NUMBER

2815

DATE MAILED: 08/21/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/938,075

Applicant(s)

ESLAMY, MOHAMMAD

Examiner

Joseph Nguyen

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-20 is/are pending in the application.
- 4a) Of the above claim(s) 16-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 9-15 and 20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other: ____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9 -15 rejected under 35 U.S.C. 103(a) as being unpatentable over Shishido et al in view of Johnson et al.

Regarding claim 9, Shishido et al discloses on figure 2 a semiconductor chip carrier comprising a primary substrate 12; a metal heat sink plate 30b having a first side and an opposing second side where said primary substrate is attached to said first side; and a supplemental substrate 30a being attached to said second side of said metal heat sink plate, wherein said supplemental is constructed from a material having a substantially similar coefficient of thermal expansion as that of said primary substrate (col. 3, lines 57-67). Note that the term "so that the presence of the supplemental substrate prevents the semiconductor chip carrier from warping" is merely functional language and therefore not given patentable weight.

Shishido et al does not disclose a metal heat sink plate having thermal coefficient of expansion being substantially different from that of said primary substrate. However, Johnson et al discloses on figure 6 a metal heat sink plate 28 having thermal coefficient of expansion being substantially different from that of said primary substrate 29. In view of such teaching, it would have been obvious to one of ordinary skill in the



art at the time the invention was made to modify Shishido et al by having a metal heat sink plate having thermal coefficient of expansion being substantially different from that of said primary substrate for the purpose of obtaining longer BGA fatigue life and less warpage as taught by Johnson et al (col. 2, lines 34-35).

Regarding claim 11, Shishido et al discloses that the primary substrate 12 is constructed from a material selected from one of FR4 (col. 3, lines 34-36).

Regarding claim 12, Shishido et al discloses the chip carrier is a ball grid array chip carrier.

Regarding claim 13, Shishido et al discloses the metal heat sink plate 30b consists of one of Cu, Al and alloys (col. 3, lines 37-40).

Regarding claim 14, Shishido et al discloses the supplemental substrate 30a has a Cu-Ni finish layer (col. 3, lines 37-40).

Regarding claim 10, Shishido et al and Johnson et al disclose substantially all the structure set forth in the claimed invention except the supplemental substrate being constructed from a same material as the primary substrate. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Shishido et al and Johnson et al by having the supplemental substrate being constructed from a same material as the primary substrate for the purpose of reducing the manufacturing cost of the semiconductor device package, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding claim 15, Shishido et al discloses on figure 2 substantially all the structure set forth in the claimed invention except the supplemental substrate having a cavity exposing a portion of the metal heat sink plate. However, Johnson et al discloses on figure 6 the supplemental substrate 22 having a cavity exposing a portion of the metal heat sink plate 28. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Shishido et al by having the supplemental substrate having a cavity exposing a portion of the metal heat sink plate for the purpose of reducing the manufacturing cost of a semiconductor device package.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shishido et al and Johnson et al as applied to claim 1 above, and further in view of Hamzehdoost et al.

Regarding claim 20, Shishido et al and Johnson et al disclose substantially all the structure set forth in the claimed invention except the primary substrate comprising a die attach cavity wherein the semiconductor chip being attached to the first side of the metal heat sink within the die attach cavity. However, Hamzehdoost et al discloses on figure 5 the primary substrate 226 comprising a die attach cavity 206 wherein the semiconductor chip 202 being attached to the first side of the metal heat sink within the die attach cavity. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Shishido et al and Johnson et al by having except the primary substrate comprising a die attach cavity

wherein the semiconductor chip being attached to the first side of the metal heat sink within the die attach cavity for the purpose of providing a reliable way of obtaining direct access to the back of an integrated circuit chip as taught by Hamzehdoost et al (col. 3, lines 15-16).

Response to Arguments

Applicant's arguments filed on 6/11/2002 have been fully considered but they are not persuasive.

With respect to claim 15, applicant argues that Shishido et al teaches that the substrate and the various parts of the metal structure all have the same coefficient of thermal expansion and Johnson et al teaches that at least plate 28 and substrate 29 comprises different materials, and thus the combination of Shishido et al and Johnson et al is not proper. However, Shishido et al also teaches the structure 18 (30) and substrate 12 can be formed of *different materials* that have substantially the same coefficient of thermal expansion (col. 3, lines 30-42). There is no teaching in Shishido that the substrate and the various parts of the metal structure must be formed of the same materials. Therefore, the combination of Shishido et al and Johnson et al is hereby proper.

Applicant's arguments with respect to claim 9 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

Art Unit: 2815

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (703) 308-1269. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 308-7382 for regular communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JN
August 15, 2002


EDDIE LEE
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